Soil Organisms — An Important Component of the Farm System

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The farm of our days is rather alienated from nature. First, because man often organises it in a short-sighted way, aiming at low investments and high profits. Man does not feel himself a member of the farm as a biological unit. Secondly, because of the narrow specialization of the farms, namely, that the plants and animals are both in theory and practice separated from the farm. They do not form a whole. Thirdly, because the biocoenological processes within a farm are neglected. Technical problems are given predominance. Fourthly, because soil processes are interpreted in the terms of chemistry and/or physics rather, than those of biology.

Actually the farm is part of the landscape. To work in a satisfactory and sustainable way, a farm should form a single organism with man as its steering centre.

The farm cannot exist, the plants and animals cannot be in good condition, when the soil is "sick". Therefore one of the main tasks is to make the soil fertile.

A fertile soil, means a soil rich in humus, a soil with an active edaphon /i.e. soil fauna/, a soil with a great diversity of species.

Building a rhizosphere in the hair-root zone, the soil organisms are responsible for the adequate feeding of every crop in a certain stage of its development.

A rich soil community controls in an effective way the populations of potential soil-dwelling pathogens and pests of cultivated plants. It must be taken into account that more than 90% of such potential undesired organisms live in the soil during at least one of their developmental stages. It should not be a surprise, that the serious problems of plant protection arise especially in biologically degraded soils.

The application of mineral fertilization only, especially to soils with poor absorbing capacity, kill many members of the edaphon, among them many enemies of the pests. The consequence is that we have to look for crop varieties resistant to pests and diseases. However, pesticides are still needed.

The good condition of the plants depends on the health of the soil. The notion "healthy soil" is understood in a different way when we speak of natural plant communities than when we discuss ones organised by man.

In a natural community a natural adaptation of the organisms to the site condition, takes place and a maximum closing of matter circulation within the ecosystem.

The field ecosystem is more open. Great amounts of yields are harvested and therefore fertilizers must be added to the soil.

But here arise the problems of the aim of fertilization, and of the type of fertilizers.

The rhizosphere is an important biological film which makes possible the adequate nutrition of the plants. Therefore soil fertility seems to be the important consideration and not nutrient availability in the soil. A good fertilizer should rather be an advantageous substrate for soil organisms than a mixture of nutrients directly available to plant roots.

This "technical" approach to agriculture has gone so far, that even manure is evaluated according to its content of chemical elements. Such a chemical interpretation of the processes of life leads to serious mistakes.

It is evident that every plant needs different amounts of substances in its various stages of development, and that its feeding habits will be controlled by soil organisms, especially those of the rhizosphere /GIDDENS and TODD, 1984/.

It is a pity, that soil organisms and soil biological processes are often described in separate publications. Also in the handbooks of soil science, where soil organisms are mentioned they are described separately from the soil, and the reader does not know how to use the information in practice.

Soil organisms are not taken into account either in the agrotechnics projects. Handbooks dealing with soil biology, on the other side, do not describe in an adequate way the soil as an extremely differentiated environment for the organisms. There are a few works only which describe the soil with a more or less holistic approach.

Our philosophy must change to approach the truth and reflect life.

Soil is a living system. We do not know how to fulfill the needs of plants for nutrition. All we know is that, thanks to the delicate interrelations between plants and edaphon, the needs of plants may be met. The soil organisms "know" what the plants want. The only thing which remains for us, and which should be taken into consideration within appropriate agrotechnics, is to give satisfaction to the soil organisms.

When we have a rich and active edaphon we have ensured optimum nutrition for our plants.

Soil tillage, too, should be maximally adopted to soil organisms. It need not necessarily be ploughing, i.e. turning the soil.

A rich and active edaphon means good living conditions for the plants. Optimum plant physiology means high quality food and fodder. The farm animals fed with fodder of high quality are healthy and produce good manure. If such manure is returned to the fields, it makes a good substrate for soil organisms and ensures soil fertility /GÓRNY,1990/.

This is the idea of an almost closed circulation of matter within the farm system.

This is the way for future agriculture, for future farms, as parts of the landscape. The ecologisation of agriculture resulting in ecological farms seems to be most efficient. This is the best idea of agriculture for the population of the world.

Within the ideal farm, a biological unit, the soil organisms play an important part.

References

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